Blackpoint and Smudge of Wheat

FarmFacts

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Blackpoint and smudge are kernel discolourations of wheat or other cereals caused by numerous species of fungi and bacteria.

Blackpoint is defined as a distinct discolouration of the germ end and surrounding area. When the discolouration affects more than one-half of the kernel or extends into the crease it is interpreted as smudge. Blackpoint and smudge discolourations are typically brown or black, but may also be reddish in colour.

Fungal Blackpoint:

Blackpoint and smudge are usually caused by fungi. The majority of blackpoint-causing fungi are relatively harmless. Although grain may be downgraded due to the discolouration, the quality of the grain for use as seed is not usually affected. Many of these fungi are saprophytic (non-pathogenic) and are commonly found growing on dead plant material such as crop residues. For example, **Alternaria** and **Cladosporium** species are commonly found on prematurely ripened wheat heads as "sooty molds", and can also cause blackpoint or smudge.

Some blackpoint fungi are cereal pathogens, including **Cochliobolus sativus**, which causes common root rot and spot blotch of wheat and barley. Pathogenic fungi may reduce germination or increase the incidence of seedling blight. Only about 5% of samples are affected by this more severe type of blackpoint or smudge. There is no easy way to distinguish between pathogenic and non-pathogenic types of blackpoint. However, penetrated smudge usually adversely affects germination.

Blackpoint or smudge infections occur in the field under conditions of high relative humidity or rainfall. Seed is susceptible to infection during filling or maturation, particularly the milk and soft dough stages. Premature ripening of seed may favour blackpoint. Exposure to rain in the swath may also increase the incidence of blackpoint.

Soft white wheats under irrigation are particularly susceptible to blackpoint due to high moisture conditions.

Red Smudge:

Red smudge is most commonly associated with durum wheat. It is a reddish or pinkish discolouration over most of the seed coat or in the crease of the seed. The seed may also be finely blistered, giving the kernels a slightly frosted appearance.

Kernels are plump and normal sized to slightly shrunken. Red smudge is caused by the fungus **Pyrenophora tritici-repentis**, which also causes "tan spot", a common leaf disease of wheat. Red smudge does not normally affect the germinability of seed or reduce seed quality, but even a low percentage may result in downgrading at the elevator. Red smudge does not affect the quality of grain for feed.

Red smudge should not be confused with Fusarium Head Blight, a disease which causes toxins to form in the grain. Red smudge produces no toxins, and is quite different in appearance. Head blight affected seeds are very shrivelled and whitish in colour, (tombstone kernels) but sometimes appear pink due to growth of the fungus. The disease requires high moisture to develop, and affects mainly winter wheat or soft spring wheat under irrigation. It is a common problem in eastern Canada in some years. Fusarium head blight seldom occurs in Saskatchewan. Red smudge affects mainly durum wheat, and kernels are seldom shrivelled or whitish in colour. It can occur even under relatively dry conditions, as long as timely showers are received during grain filling.

Bacterial Blackpoint:

The bacteria **Pseudomonas syringae** pv **atrofaciens** may cause blackpoint symptoms on wheat. The bacteria also causes a disease called "basal glume rot", in which the glumes become darkened or streaked towards the base. Glume discolouration is often more visible on the inner glume surface. Kernels are usually badly shrunken and stained brown to black at the embryo end. Bacterial blackpoint does occur in Saskatchewan, but it is not very common. It should not be confused with the more common **Septoria** glume blotch, which does not cause any kernel discolouration. Septoria glume infections often begin at the tips and develop downwards as purplish to greyish lesions. Grain infected with bacterial blackpoint should not be used as seed.

Control:

The development of blackpoint or smudge is very weather dependent. Little can be done to prevent this problem. Cultural control recommendations for irrigated crops include avoiding heavy irrigation after flowering is complete. Wheat is most susceptible to infection during the milk

and soft dough stages. The worst time to irrigate is 2 or 3 days after a heavy rain, because fungal spore production will be at a peak. Providing additional water at this time will enhance the infection process. Wait until the soil surface under the crop canopy dries before irrigating. It is safe to irrigate late in the season if conditions are extremely dry. Avoid high application rates of nitrogen. It has been observed that red smudge is less of a problem where durum is grown on summerfallow or after a rotation rather than on wheat stubble.

There are some differences in susceptibility to blackpoint and smudge between varieties, however few recommended varieties have any resistance. Breeding for blackpoint resistance in soft white wheat is underway at the Lethbridge Research Station.

Resistant:	Benito, Glenlea, Park
Intermediate:	Leader
Susceptible:	All others, including all durums and soft white spring wheats

Planting fungicide treated seed will not help to control blackpoint or smudge. However, seed treatment may improve emergence and decrease seedling blight infection of seedlings grown from kernels with blackpoint or smudge. Before deciding to plant discoloured seed, it would be advisable to carry out a germination test.

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